

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

In re Patent Application of:)	
BELL ET AL.)	
)	
Serial No. 10/719,203)	Examiner: O. HERNANDEZ
)	
Filing Date: NOVEMBER 21, 2003)	Art Unit: 3661
)	
Confirmation No: 1976)	
)	
For: MOBILE DATA COLLECTION AND)	
PROCESSING SYSTEM AND METHODS)	
)	

APPELLANTS' SUPPLEMENTAL APPEAL BRIEF

MS Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is Appellants' Supplemental Appeal Brief in response to the Order Returning Undocketed Appeal to Examiner from the Board of Patent Appeals and Interferences mailed February 23, 2006 and the telephone interview with Examiner Nguyen on May 1, 2006. If any extension and/or fee is required, authorization is given to charge Deposit Account No. 08-0870.

(1) Real Party in Interest

The real party in interest is Harris Corporation, assignee of the present application as recorded at reel 014747, frame 0524.

(2) Related Appeals and Interferences

At present there are no related appeals or interferences.

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(3) Status of the Claims

Claims 1-25 are pending in the application, all of which are rejected and are being appealed herein.

(4) Status of the Amendments

All amendments have been entered and there are no further pending amendments. A copy of the claims involved in this appeal is attached hereto as Appendix A.

(5) Summary of the Claimed Subject Matter

Referring to FIGS. 1 and 2 (reproduced below), the disclosed invention is directed to a mobile data collection system 10 and method that can operate at higher speeds. The system of independent Claim 1 includes a positioning system 22 to generate position and time data, a down-looking line scan camera 12 for mounting on a vehicle 14 to obtain a series of line scan images, and a data collection controller 20 connected to the positioning system and the line scan camera to associate line scan images with corresponding position and time data.

Independent Claim 11 is directed to a mobile road-centerline data collection and processing system 10 including: a vehicle 14 for traveling along a road 16; a positioning system 22 carried by the vehicle to generate position and time data; a down-looking line scan camera 12 with an attached wide-angle lens 36 mounted on the vehicle to obtain a series of line scan images of the road; and a data collection controller 20, carried by the vehicle and connected to the

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positioning system and the line scan camera to associate line scan images with corresponding position and time data, the data collection controller comprising an image processor 32 to identify and mark road features in the line scan images.

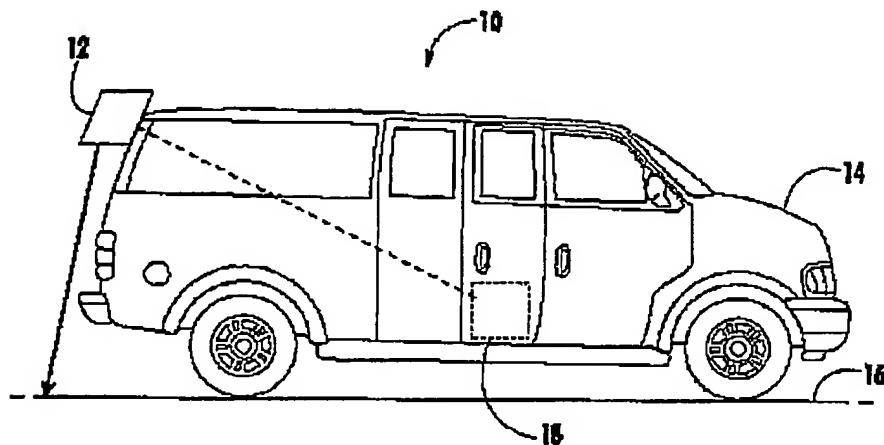


FIG. 1

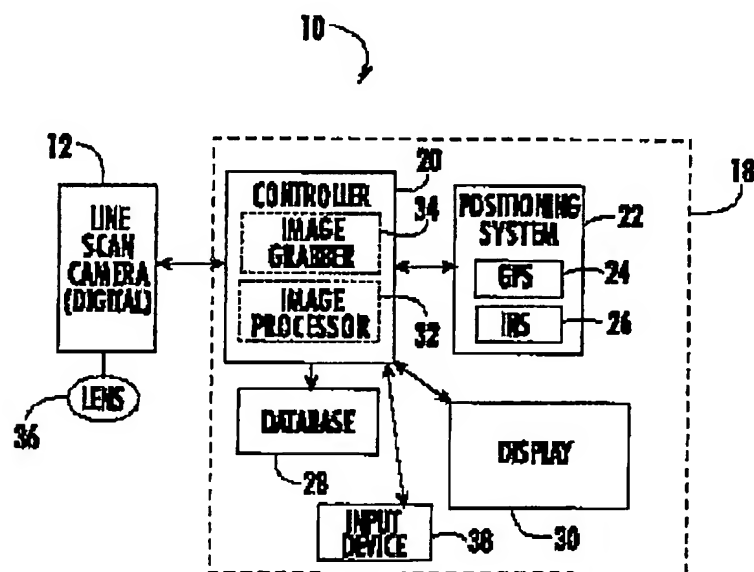


FIG. 2

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Independent Claim 19 is directed to a method for road-centerline data collection and processing comprising: providing a positioning system 22 in a vehicle 14 to generate position and time data; moving the vehicle 14 along a road 16 and operating a down-looking line scan camera 12 to obtain a series of line scan images of the road; and associating the line scan images with corresponding position and time data from the positioning system 22.

The down-looking line scan (also known as a broom sweep because of the way it "sweeps" to form an image from a combination of line scans) camera 12 scans across the road/path 16 as the vehicle 14 travels. Advantages are that because the camera 12 takes images a single scan at a time (e.g. a single line of pixels) the vehicle 14 can travel at higher speeds and collect a smaller volume of data than systems which use an area scan camera. As appreciated by those skilled in the art, the resolution of a line scan camera is approximately 10 times higher than an area camera, and image capture speed by a line scan camera is considerably faster than the typical speed of an area camera. Also, in the inspection of a continuous object, e.g. the roadway, it's difficult to get synchronization with an area camera. However, continuous processing is more easily done with a line scan camera because of its video output of each scan.

(6) Grounds of Rejection to be Reviewed On Appeal

In view of the arguments presented in the Appeal Brief, the Examiner withdrew the previous rejection of Claims 1-3, 9-14 and 19-21 under 35 U.S.C. § 102(b) as being

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anticipated by Kimura (U.S. Patent Publication No. 2001/0056326); and the rejection of Claims 4-8, 14-18 and 22-25 under 35 U.S.C. § 103(a) as being unpatentable over Kimura (U.S. Patent Publication No. 2001/0056326) in view of Satoh et al. (U.S. Patent No. 6,473,678). These rejections were maintained by the Examiner in two previous Office Actions.

However, contrary to the prohibition of 37 CFR 1.193(a)(2), the Examiner entered a new ground of rejection in the Examiner's Answer mailed July 28, 2005. To proceed with the Appeal, and because the Examiner's new ground of rejection is also improper (for the reasons set forth below), Appellants hereby waive the objection to the impermissible new ground of rejection.

So, now, the grounds of rejection to be reviewed on appeal are: Claims 1-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura (U.S. Patent Publication No. 2001/0056326); and, Claims 8, 18 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kimura (U.S. Patent Publication No. 2001/0056326) in view of Satoh et al. (U.S. Patent No. 6,473,678) for the reasons set forth on pages 3-5 of the Examiner's Answer.

(7) Argument

Independent Claims 1, 11 and 19 are Patentable Over Kimura

Appellants contend that independent Claims 1, 11 and 19 clearly define over the cited reference, and in view of the following remarks, reversal of the rejection under 35 U.S.C. §103(a) is requested.

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As discussed in the previous replies and the Appeal Brief, each of the independent Claims 1, 11 and 19 includes a positioning system in a vehicle to generate position and time data, a down-looking line scan camera to obtain a series of line scan images of the road, and associating the line scan images with corresponding position and time data from the positioning system. It is these combinations of features which are not fairly taught or suggested in the cited references and which patentably define over the cited references.

The Examiner has again relied on the Kimura publication (Fig. 1 reproduced below) as disclosing a positioning system, a camera and a controller to associate images with position and time data. The Kimura publication is directed to a navigation apparatus performing a map matching process to determine the road on which a vehicle is traveling.

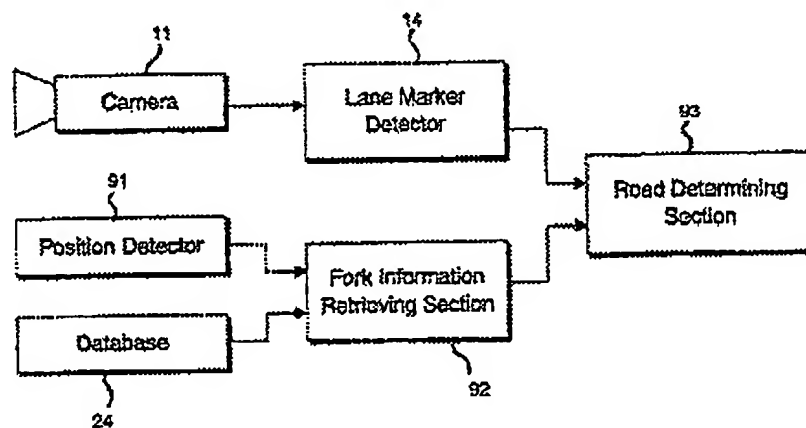


Fig. 1

The system of Kimura uses a CCD camera 11 but there is no mention of a line scan camera, as claimed in the present application. Indeed, nothing in Kimura teaches the association

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of line scan images with the corresponding position and time data as in the present invention.

As discussed in the present application, the present invention provides a more accurate mobile data collection system and method that can operate at higher speeds with the use of a line scan camera and association of line scan images with corresponding position and time data. It is Appellants who discovered the advantages of using line scan images with corresponding position and time data over using conventional CCD area cameras as taught by Kimura.

On page 3 of the Answer, the Examiner asserts that "Kimura's CCD camera is similar to the CCD element in applicant's camera, and a lane marker detector" and that "it would have been obvious to one skilled in the art to construct a formerly integral part structure in various elements [sic] involves only routine skill in the art." Furthermore, the Examiner asserts that "the CCD elements and lane marker detector in applicant's invention provide the same output as applicant's line scan camera."

Again, the Examiner's position and rationale are puzzling. Indeed, the Examiner is asserting that the camera in Kimura is "similar" to Appellants claimed line scan camera, and further, with Kimura's lane marker detector, "provides the same output" as Appellants' camera. Appellants specifically traverse this assertion. Nothing in Kimura, let alone the area camera 11 and lane marker detector 14, can be considered to be a line scan camera, as claimed. Nothing in Kimura, individually or in combination, obtains a series of line scan images of the road, and associates the line scan images with

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corresponding position and time data from the positioning system, as claimed.

As illustrated in Figs. 14 and 15 of Kimura, camera 11 outputs roadway images of an area of the roadway. These images are clearly not line scan images as claimed. The "lines" referred to by Kimura in paragraphs 0201-0205 are the left and right edges 52L, 52R, 53L, 53R of lane markers 52 and 53. Furthermore, the "scanning lines" referred to by Kimura are used in a pixel scanning process within the area images (Figs. 14 and 15) by the lane marker detector to detect lane markers.

In the present invention, the down-looking line scan camera 12 (also known as a broom sweep because of the way it "sweeps" to form an image from a combination of line scans) scans across the road/path 16 as the vehicle 14 travels. Advantages are that because the camera 12 takes images a single scan at a time (e.g. a single line of pixels) the vehicle 14 can travel at higher speeds and collect a smaller volume of data than systems which use an area scan camera. As appreciated by those skilled in the art, the resolution of a line scan camera is approximately ten times higher than an area camera, and image capture speed by a line scan camera is considerably faster than the typical speed of an area camera. Also, in the inspection of a continuous object, e.g. the roadway, it's difficult to get synchronization with an area camera. However, continuous processing is more easily done with a line scan camera because of its video output of each scan.

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It appears that the Examiner is misinterpreting the claimed feature of a "line scan camera" to merely be an area scan camera that images lanes on a road. Such an interpretation is inconsistent with the claim language, the present specification and the use of the term "line scan camera" by those of ordinary skill in the field of imaging.

Again, nothing in Kimura teaches the use of a line scan camera or the association of line scan images with the corresponding position and time data as claimed in the present application. Accordingly, the rejection of independent Claims 1, 11 and 19 under 35 U.S.C. §103 is inappropriate and should be reversed.

Claims 8, 18 and 25 are also patentable over Kimura in combination with Satoh et al.

Satoh et al. was relied upon by the Examiner as teaching the use of a display. Without discussing any details of the Examiner's obviousness rejections, it is sufficient to again point out that the Examiner has not provided any teaching of the use of a line scan camera or the association of line scan images with the corresponding position and time data as claimed in the present application.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim features. The

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initial burden is on the Examiner to provide some suggestion of the desirability of doing what the Applicants have done.

Summary

There is simply no teaching or suggestion in the cited references to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Appellants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claims 1, 11 and 19, and the Examiner has failed to establish a prima facie case of obviousness. Thus, the rejections under 35 U.S.C. §103 should be reversed.

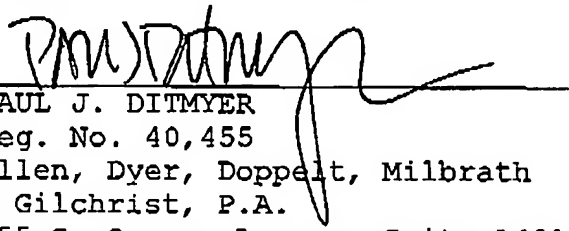
It is submitted that the independent claims are patentable over the prior art. In view of the patentability of the independent claims, it is submitted that their dependent claims, which recite yet further distinguishing features are also patentable over the cited references for at least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

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III. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the claims are patentable over the prior art. Accordingly, Appellants respectfully request that all of the rejections be reversed.

Respectfully submitted,


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Claims Appendix for Application Serial No. 10/719,203:

1. A mobile data collection system comprising:
a positioning system to generate position and time data;
a down-looking line scan camera for mounting on a vehicle to obtain a series of line scan images; and
a data collection controller connected to the positioning system and the line scan camera to associate line scan images with corresponding position and time data.
2. The mobile data collection system according to Claim 1 further comprising a database to store the line scan images and associated corresponding position and time data.
3. The mobile data collection system according to Claim 1 wherein the positioning system comprises a Global Positioning System (GPS) receiver.
4. The mobile data collection system according to Claim 3 wherein the positioning system further comprises an Inertial Navigation System (INS).
5. The mobile data collection system according to Claim 1 wherein the line scan camera comprises a digital line scan camera and an attached wide-angle lens.

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6. The mobile data collection system according to Claim 1 wherein the line scan camera comprises an attached fish-eye lens.

7. The mobile data collection system according to Claim 1 wherein the data collection controller comprises a central processing unit and a frame grabber.

8. The mobile data collection system according to Claim 1 further comprising a display device connected to the data collection controller to display the line scan images.

9. The mobile data collection system according to Claim 1 wherein the data collection controller comprises an image processor to identify and mark road features in the line scan images.

10. The mobile data collection system according to Claim 10 wherein the image processor identifies road features comprising at least one of road edges, lane markings and centerline.

11. A mobile road-centerline data collection and processing system comprising:

- a vehicle for traveling along a road;
- a positioning system carried by the vehicle to generate position and time data;

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a down-looking line scan camera with an attached wide-angle lens mounted on the vehicle to obtain a series of line scan images of the road; and

a data collection controller, carried by the vehicle and connected to the positioning system and the line scan camera to associate line scan images with corresponding position and time data, the data collection controller comprising an image processor to identify and mark road features in the line scan images.

12. The mobile data collection system according to Claim 11 further comprising a database to store the line scan images and associated corresponding position and time data.

13. The mobile data collection system according to Claim 11 wherein the positioning system comprises a Global Positioning System (GPS) receiver.

14. The mobile data collection system according to Claim 13 wherein the positioning system further comprises an Inertial Navigation System (INS).

15. The mobile data collection system according to Claim 11 wherein the line scan camera comprises a digital line scan camera and an attached wide-angle lens.

16. The mobile data collection system according to Claim 11 wherein the line scan camera further comprises an attached fish-eye lens.

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17. The mobile data collection system according to Claim 11 wherein the data collection controller comprises a central processing unit and a frame grabber.

18. The mobile data collection system according to Claim 11 further comprising a display device connected to the data collection controller to display the line scan images.

19. A method for road-centerline data collection and processing comprising:

providing a positioning system in a vehicle to generate position and time data;

moving the vehicle along a road and operating a down-looking line scan camera to obtain a series of line scan images of the road; and

associating the line scan images with corresponding position and time data from the positioning system.

20. The method according to Claim 19 further comprising processing the line scan images to identify and mark road features.

21. The method according to Claim 19 further comprising storing the line scan images and associated corresponding position and time data in a database.

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22. The method according to Claim 19 wherein the line scan camera comprises a digital line scan camera and an attached wide-angle lens.

23. The method according to Claim 22 wherein the wide-angle lens comprises a fish-eye lens.

24. The method according to Claim 19 wherein associating each line scan image with corresponding position and time data from the positioning system comprises providing a central processing unit and a frame grabber connected to the positioning system and the line scan camera.

25. The method according to Claim 19 further comprising connecting a display device to the line scan camera to display the line scan images.

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APPENDIX B - EVIDENCE APPENDIX
PURSUANT TO 37 C.F.R. § 41.37(c) (1) (ix)

None.

APPENDIX C - RELATED PROCEEDINGS APPENDIX
PURSUANT TO 37 C.F.R. § 41.37(c) (1) (x)

None.

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CERTIFICATE OF FACSIMILE TRANSMISSION

I HEREBY CERTIFY that the foregoing correspondence has
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1450 this 1st day of May, 2006.

